

NEW *CATOCALA* OF NORTH AMERICA (NOCTUIDAE)

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All but one of these species fall in our two most difficult groups of the small *Catocala*—the *crataegi* group in the East and the *andromache* group in the West, though when we really know the early stages of all species, further division may be indicated. I have spent a great amount of time and work mounting specimens, preparing genitalia and studying these genitalia to arrive at only indefinite characters based on structure on which to separate the species. The adults vary throughout their range and in some local areas noticeably different specimens occur. The great need is for adequate material of eggs, larvae and pupae of all species to be available for comparison, and in the adults, a series from many scattered places in its range. Larval descriptions in the *crataegi* group are tenuous or non-existent, and nothing seems to have been published on the early stages of any of the *andromache* group, except *cheli-donia* Grote. With probably the greatest series in existence of these species and closely related ones before me, I believe all of the following proposed species warrant the title new species, when a series is closely studied. For many years specimens of the *andromache* group have been sought by two experienced workers, J. W. Johnson and Erich Walter, and several females of each of several species have been confined for eggs, without securing an egg. The series of specimens have been possible only through the generous help of collectors and the institution named in connection with types. Unless otherwise stated all types remain in the author's collection at present.

***Catocala texarkana* Brower new species**

(Fig. 1)

The forewing is of a light uniform gray, somewhat darker basally, and along the inner margin, the basal area in the fold toward the transverse anterior line with definite ribbing. The median area from costa to inner margin or to fold is conspicuously whitish, with a segment of a median line to the reniform usually present, and some darker shading between the reniform and transverse posterior line. The lines are narrow, brownish black, with a few short teeth or rounded bows; the basal half-line is faint with an outward angle and a rounded bow to its end; the t.a. line is heavy black, with additional black shading basally, of short zig-zags to the fold, thence toothed inward and then somewhat outwardly bowed to inner margin; the t.p. line is fine, scarcely toothed except for the short two large teeth, thence an inward arc to the blacker horizontal segment in the fold, thence bowed outward to the inner margin; and subreniform usually separate, irregular, small; the gray reniform rather small, upright, set out by an irregular, conspicuous white border;

beyond the t.p. line a variable brown band is present, followed by a faint white subterminal line; a terminal line of shallow crescents; from the large teeth of the t.p. a dark dash to below the apex. The hindwing is orangish yellow; the outer band moderate, leaving a small yellowish to orangish apex, and is usually broken before anal end, swollen toward the upper end and again in the M_2 -Cu area; this bends and extends to the base of the wing. Beneath, the hindwing repeats the upperside, except paler; the forewing is as usual. The species *texarkana* is most readily separated from other species of the *crataegi* group, when, with its form *bridwelli*, it is compared with them in series. I name this form *bridwelli* (Fig. 2) after L. H. Bridwell who reared from *Crataegus* many specimens of both forms. The type ♂ of *bridwelli*, Forestburg, Texas, 1200 ft., 13 May 1939. In addition 32 specimens have been set aside as this form. It is characterized by a much blacker basal area including a heavy black t.a. line, some becoming browner and grayer toward the base. The types have the lighter gray median area continued to the inner margin, but many of this form have the inner margin darker, in an extension of the basal area.

Holotype. ♂, Forestburg, Texas, 1200 ft., 10-12 May, 1940, L. H. Bridwell, probably reared from larvae beaten from *Crataegus*.

Allotype. ♀ ditto, 13 May, 1939, reared from *Crataegus*.

Paratypes. 40 ♂ and 42 ♀; Forestburg, Texas, 12 ♂, 15 ♀, May 1939, mostly reared; Forestburg, May 1940, 28 ♂ and 25 ♀; Lincoln Co., Arkansas, May 3 and 4, 1938, 2 ♀; all L. H. Bridwell. From other localities I have the following: a ♂ labelled "Texas", W. N. Tallant collection; a ♀ College Station, Texas, April 19, 1929; a ♂ Churchill Bridge, Brazoria Co., Texas, 3-V-1968 (A. and M. E. Blanchard); all three too poor to include in the types. The Blanchard's showed me the Churchill Bridge collecting locality when I visited Houston.

Expanse (part reared) of a series of each: ♂ 41 mm.; ♀ 43 mm.

Catocala lincolnana Brower new species

(Fig. 3)

Lincolnana is a simply marked species, brownish gray on basal, apical, and anal areas, and along inner margin beyond transverse anterior line; the remainder light gray with some brown. The basal half-line is evident, the transverse anterior line is heavy, black, of short zig-zags, nearly straight and oblique to the inner margin; the reniform, a small upright oval, fringed with white; the subreniform irregular, rather large, and separate; the transverse posterior line is fine, shortly toothed, largely transverse to the fold, when a long inward segment carries it to near the t.a. line. The subterminal line of lighter short hastae is evident, the terminal line of short bars scarcely evident. The hindwing above is as usual in the *Crataegus*-feeders, with a larger orangey apical area, a large oval black spot before the anal angle; the median band a bit narrow and extending to the base; this pattern repeated below on the hind wing and the usual pattern beneath on the forewing.

Expanse: ♂ 47 mm.

Holotype. ♂, Lincoln Co., Arkansas, 1 June 1937, L. H. Bridwell. Type in author's collection.

Catocala johnsoniana Brower new species

(Fig. 6)

The ground color of the forewings is ashy gray with prominent black lines. Beyond the transverse anterior line, from the costa a darker oblique shade passes across the reniform and on to the transverse posterior line above the subreniform;



Figs. 1-6. *Catocala* species. 1, *Catocala texarkana*, Forestburg, Texas, 10-12 May 1940, ♂, holotype; 2, *C. texarkana* form *bridwelli*, Forestburg, Texas, 13 May 1939, ♂; 3, *C. lincolnana*, Lincoln Co., Ark., 1 June 1937, ♂, holotype; 4, *C. erichi*, Green Valley Creek, San Bernardino Mts., Calif., ex ovum, 19 May 1966, ♂, holotype; 5, *C. californiensis*, Valyermo, Los Angeles Co., Calif., 27 June 1957, ♂, holotype; 6, *C. johnsonana*, Kernville, Kern Co., Calif., 17 June 1965, ♂, holotype.

beyond and above the reniform a less defined paler blotch extends to the t.p. line. The basal half-line is black and transverse: the t.a. line is heavy and black, nearly straight to Cu_2 , then curved and tapered to A_1 , thence obliquely outward to inner margin. The basal dash is present. The t.p. line extends outward on R, then barely toothed to most outward point, thence with three short acute teeth to the loop forming the small pale subreniform (open, closed, or disconnected), thence strongly curved to A_1 , and nearly direct to the inner margin. The subterminal line is whiter gray, the terminal line of connected crescents. The fringes are gray. The medium-sized inconspicuous reniform is commonly darker-centered and outlined by paler scales. The hindwing above is orangish yellow, the outer black band well developed with an apical patch of ground color, usually a small spot broken off before the anal angle; median black band narrowed, with an outward bulge on R and a second one M_2 to Cu_2 , little tapered, usually but little turned inward and ending bluntly. Beneath, the forewing is pale yellow with the usual dark and light areas; the hind wing orangish yellow; the outer black band medium

width, with small apical area of ground color, usually unbroken. The median band rather narrow, oblique, nearly even, until M_2 , when set out more than width of band, soon narrowed, the very end of the terminal portion turned toward inner margin, and ending abruptly.

Expanse: ♂ 49.5 mm.; ♀ 52 mm.

Holotype. ♂, Kernville, Kern Co., Calif., 17 June 1965 (Erich Walter).

Allotype. ♀, Kern River Canyon, Kern Co., Calif., 29 May, 1954 (Wm. A. Rees).

Paratypes. 5 ♂, 1 ♀: Kern Canyon, Kern Co., Calif., elevation 2800 ft., 29 May, 1954 ♂ (C. A. Hill); Kernville, Kern Co., Calif., 2500 ft., 16 June 1965 ♂, 21 June 1965 2 ♂ (Erich Walter); 18 June 1966 ♂ (J. W. Johnson and E. Walter); Hughes Lake, Los Angeles Co., Calif., 23 June 1971 ♀. Holotypes and paratypes collection A. E. Brower. Allotype and part of paratypes returned to Natural History Museum, Los Angeles.

Catocala californiensis Brower new species

(Fig. 5)

The ground color of the forewings is ashy gray, varying from light to brownish gray, with a broad lighter band from costa beyond the transverse anterior line to the subreniform, and including a still whiter gray subreniform; with a black shade from mid-costa over reniform to strongly inbowed transverse posterior line, which has short stout teeth on M_1 and M_2 with a short tooth inward on the fold. The lines are heavy black, especially the transverse anterior line, which is nearly straight to the fold; the t.a. set out by a paler gray basal edging, the t.p. less so by an outer paler line; the basal half-line black, somewhat jagged; the basal dash absent; a more or less evident subterminal band of lighter sagittate marks; the terminal black scalloped band is usually continuous; the fringes gray. The hindwing above has the inner black band narrow, nearly straight, swollen outward from M_2 to Cu_2 , then greatly attenuated and sharply angled inward toward the inner margin; the outer band of moderate width, usually broken before anal end, and with a yellow patch before apex. Beneath, both wings are much paler, the forewing with the usual pattern, and the hind wing a duplication of the upper side.

Expanse: ♂ 46 mm.; ♀ 47.5 mm.

Holotype. ♂, Ranch two and one half miles south-southwest of Valyermo, Los Angeles Co., Calif., 4800 ft., 27 June 1957 (Noel McFarland).

Allotype. ♀, Pinyon Flats, Santa Rosa Mts., Calif., 10 July, 1967, ultra-violet light, (J. W. Johnson and Erich Walter).

Paratypes. 10 ♂, 11 ♀: near Acton, Mint Canyon, Los Angeles Co., Calif., 3 June 1950 ♂ (Chas. A. Hill); Tujunga, Los Angeles Co., Calif., 26 June 1940 ♀ (C. Henne); ranch two and one half miles south-southwest of Valyermo, Los Angeles Co., Calif., 4800 ft., 26 June 1957, 3 ♂, 3 ♀, and 1 July 1964 ♀ at black light (Noel McFarland); nine miles southeast of Pearblossom, Los Angeles Co., Calif., 27 June 1947 ♂ (Noel McFarland); Pinyon Flats, Calif. [Santa Rosa Mts.], 5 July 1970 ♂, 16 July 1967 ♀ (the last two J. W. Johnson handwriting); Pinyon Flats, Santa Rosa Mts., Calif., 4000 ft., 3 July 1970 ♂, 10 July 1967 2 ♂, 1 ♀, 11 July 1967 1 ♂, 3 ♀, ultra-violet light, 16 July 1969 ♂, 18 July 1968 2 ♀, ultra-violet light (J. W. Johnson and Erich Walter).

Catocala erichi Brower new species

(Fig. 4)

The forewings are black, tinged with brown, appearing more or less overscaled with somewhat smaller white scales with a bluish sheen, best developed in the median area. Basal half-line of black inner, and white outer lines; transverse anterior line, strongly zig-zag of white inner and black outer portions, appearing black on

both sides; before and somewhat below the reniform is a striking white patch, and another in the median area between the inward bulge of the transverse posterior line and the subterminal line; the apical area is brownish black, and from it to the outer angle the margin is variably gray and white; the reniform is rather large, upright, irregular, vague, partially outlined with black and may be more so outside with white; the subreniform is usually separate, lighter with brownish overshading; the transverse posterior line is short-toothed, largely transverse, black inside, white outside; the subterminal line, of short broad white chevrons, is prominent; the terminal line is of short bars or shallow crescents; terminal dark crescents form a more or less continuous line at the base of the fringe. On some the black obscures all except the two white patches and the subterminal line. The hindwings are deep red with strong black bands, with white to pink margined apices; the median black band more or less abruptly ending or greatly contracted with the narrowed end turned upward, with long black hair near base of wing. Beneath, on forewing the wings are much paler with the bands as usual, and on hindwing a paler reproduction of the upper side. During separated years broods of this species were reared from eggs and with caught specimens form an unusually similar series of specimens, well separated from *francisca* Hy. Edwards, and from the more northern complex of *mariana*, Hy. Edwards, *edwardsi* Kusnezov and *eldoradensis* Beutenmüller. Larvae of *erichi* (named for the chief collector), two broods, lost in the last instar the dark brown patch on the abdominal hump, while larvae of *francisca* kept their patch.

Expanse (nearly all reared); ♂ 66 mm.; ♀ 68 mm.

Holotype. ♂, emerged 19 May 1966, reared by J. W. Johnson, ova Green Valley Creek, San Bernardino Mts., Calif., 7000 ft., Aug. 1965 (E. Walter).

Allotype. ♀, San Bernardino Mts., Calif., 7000 ft., reared by J. W. Johnson, emerged May 1971, ova by E. Walter summer of 1970.

Paratypes. 11 ♂, 8 ♀: Green Valley Creek, San Bernardino Mts., Calif., 7000 ft., ova from female August 1965 by Erich Walter, reared by J. W. Johnson and Erich Walter, adults emerged May 18 until June 21, 1966, 4 ♂, 3 ♀. Of a second lot of ova, summer of 1970, by Erich Walter, reared by both Johnson and Walter in 1971, 4 ♂, 3 ♀ emerged late June to July 27; Hathaway Creek, near Barton Flats, San Bernardino Mts., Calif., 2 August 1940 ♂ (C. Henne); Camp O-ongo, near Running Springs, San Bernardino Mts., Calif., 28–31 August 1967 ♀ (C. L. Hogue). Types at present in my collection, paratypes returned to Natural History Museum, Los Angeles, J. W. Johnson and Erich Walter.
